ISSN 1753-044X

Volume 4 Issue 1
January 2010

INTERNATIONAL JOURNAL OF CLINICAL SKILLS

A Peer Reviewed International Journal for the Advancement of Clinical Skills

- 'docendo ac discendo' - 'by teaching and learning'

In this issue:

Executive Board

International Journal Of Clinical Skills
P O Box 56395
London
SE1 2UZ
United Kingdom

E-mail: info@ijocs.org
Web: www.ijocs.org
Tel: +44 (0) 845 0920 114
Fax: +44 (0) 845 0920 115

Published by SkillsClinic Ltd.

Acknowledgements

We would like to take this opportunity to show appreciation to all those involved with the production of the International Journal of Clinical Skills (IJOCS). Many thanks to all members of the Editorial and Executive Boards.

A special thank you to Dr Mayoor Agarwal for his rich enthusiasm and kind support.

The International Journal of Clinical Skills looks forward to contributing positively towards the training of all members of the healthcare profession.

Contents

Editorial Board for the International Journal of Clinical Skills

Disclaimer & Information

Foreword

As we head into the New Year of 2010, the International Journal of Clinical Skills (IJOCS) can feel justifiable pride that it has fulfilled its ambition to provide the international healthcare community with an arena for clinical skills education and research. For almost all the healthcare professions, clinical skills form the basic foundations and therefore a combined approach is absolutely what is needed for the future provision of a high quality health service.

The role of the ePortfolio in both education and continuing professional development of healthcare professionals continues to evolve as training and revalidation become increasingly important. Clinical skills are an essential element of this process and in 2010 the IJOCS will be proud to publish abstracts and papers from the 8th international ePortfolio conference hosted by ElfEL London Learning Forum 2010. Further information can be found at www.ijocs.org/eportfolio

This year will also see the launch of the new and exciting 'CliniTube' website – a free resource providing a single portal for accessing and sharing an array of information. It should be a valuable resource for students and should give teachers of numerous disciplines the opportunity to share educational materials. I'm certainly looking forward to seeing the 'Clinical Skills Lab' which should become an integral component of CliniTube and will comprise information on a variety of clinical skills.

The International Journal of Clinical Skills is a unique publication in its devotion to clinical skills. I encourage professionals all over the world to continue contributing to its on-going success. After all, our patients deserve nothing less than the best.

Professor David Haslam FRCGP FRCP FFPH FAcadMed (Hon) CBE
Immediate Past-President of the Royal College of General Practitioners (RCGP)
National Clinical Adviser to the Care Quality Commission
United Kingdom

Assessing the prescribing skills of trainee medical staff: implementation of a routine assessment and remedial training strategy

Dr Deborah J F Mayne MB BS MRCP CertClinEd
Research and Teaching Fellow
City Hospitals Sunderland NHS Foundation Trust
Sunderland

Professor Anthony J Hildreth MSc
Professor of Medical Statistics
Northumbria University
School of Health, Community and Education Studies
Newcastle Upon Tyne

Dr Janice E O'Connell BSc MB ChB FRCP
Senior Lecturer in Geriatric Medicine
Clinical Tutor Undergraduate Medical Education
Newcastle University and City Hospitals Sunderland NHS Foundation Trust
Sunderland

Mr Leslie Boobis MD FRCS FRCSE
Medical Director
City Hospitals Sunderland NHS Foundation Trust
Sunderland

Professor Christopher S Gray MD MB BS FRCP LLB
Clinical Sub Dean and Director of Medical Education & Research
Newcastle University and City Hospitals Sunderland NHS Foundation Trust
Sunderland

Correspondence:
Dr Deborah Mayne
Department of Research and Development, Education Centre
City Hospitals Sunderland NHS Foundation Trust
Kayll Road
Sunderland
SR4 7TP
UK

E-mail: deborah.mayne@doctors.org.uk
Tel: +44 (0) 1912 461697
Fax: +44 (0) 1915 699767

Keywords:
Prescribing errors
Junior doctors
Education
Patient safety
Competency

Abstract

Introduction: There is increasing recognition that newly qualified doctors often feel unprepared for employment, particularly with regards to prescribing. This lack of preparedness undoubtedly contributes to clinical error and decreases patient safety.

Methods: Trainees attending induction in a large NHS foundation hospital participated in a compulsory clinical assessment of prescribing skills. Trainees were presented with a clinical scenario from which they were required to prescribe specified drugs on a hospital prescription chart. A consensus panel marked the station according to pre-specified 'critical' errors or omissions. Candidates who made critical errors or omissions were invited to remedial training and reassessment.

Results: In total 120 trainees were assessed, of whom 72.5% (87/120) made critical errors or omissions. Subsequently, 79.3% (69/87) of trainees were reassessed; 79.7% (55/69) of whom passed on 2nd attempt, and 78.6% (11/14) passed on 3rd attempt; 3 doctors did not attend further reassessment. The most common critical errors were: prescription of the wrong dose of warfarin (59.2%); failure to stop aspirin (44.6%); and inappropriate abbreviation of 'units' when prescribing insulin (39.8%). 47 candidates (38.8%) prescribed amoxicillin in a penicillin allergic patient. Foundation Year 1 doctors performed worse than Senior House Officer (SHO) and Specialist Registrar (SPR) doctors (Mann-Whitney test, $p<0.001$, $p=0.12$ respectively) and made more critical errors ($p=0.003$ and $p=0.32$).

Discussion: It cannot be assumed that newly appointed doctors prescribe safely. Critical errors or omissions were made by all grades of medical staff, but particularly Foundation Year 1 doctors. Steps to improve exposure to prescribing practice in the undergraduate curriculum should be encouraged and linked to ongoing development of skills throughout practice.

Background

It is assumed that newly qualified doctors bring to the work place core clinical skills as assessed in their undergraduate curricula and defined by the United Kingdom General Medical Council (GMC). Similarly, for postgraduate trainees there is an assumption that they have both maintained and acquired competence in core clinical skills and their speciality specific skills respectively.

Standards of knowledge, skills, attitudes and behaviours that medical students should learn at UK medical schools are defined by the GMC and subject to review in the light of developments in educational theory, research and professional practice [1]. Against this background of expectation, assumptions and standard setting, there is increasing recognition that newly qualified doctors often feel unprepared for employment.

A recent study undertaken on behalf of the GMC into medical graduates' preparedness for practice highlighted those areas reflecting lack of preparedness [2]. Whilst these were largely related to gaining experience on the wards and becoming familiar with hospital protocols and procedures, all sources of data studied indicated a lack of preparedness for prescribing. A recent online questionnaire across all UK medical schools and National Health Service (NHS) Trusts assessed final year medical students' and Foundation Year 1 doctors' thoughts on prescribing and their training [3]. Only 38% felt confident in prescription writing. The majority of respondents found the amount of training in pharmacology, therapeutics and prescribing was 'too little' or 'far too little'. This lack of preparedness will inevitably contribute towards medication errors.

In one London teaching hospital an estimated 1.5% of prescriptions contained a medication error, of which a quarter were deemed potentially serious and likely to result in patient harm [4]. The most common types of errors are related to drug dosage or those made on handwritten prescriptions rather than using a computerised medication order entry system [5]. A worrying number of errors, however, relate to drug allergy information [6, 7]. These findings are not new and there is increasing pressure upon NHS Trusts to demonstrate evidence of competence in prescribing for their medical staff.

The NHS Clinical Negligence Scheme for Trusts (CNST) was established in 1994 to provide a means for Trusts to fund the costs of clinical negligence litigation and also to encourage and support management of claims and risk [8]. Trusts are assessed against their compliance with standards (levels 1-3), which entitles them to discounted contributions to the scheme ranging from 10-30%. NHS Trusts must show evidence that they have developed systems for induction, training and assessment of competence of junior medical staff. In order to meet these standards NHS Trusts are introducing local initiatives to reduce their CNST contributions, including processes to induct, assess and train staff in clinical areas or in skills that are perceived to be associated with risk.

We previously developed a classroom-based assessment of core clinical competencies as a tool for assessing and developing clinical skills and identifying risk in newly appointed training grade doctors. Overall, trainee performance suggested an acceptable level of competence [9]. However, continuing concerns regarding safe prescribing prompted a review of how this process could be further developed in order to identify those at risk and provide remedial training and reassessment.

Objective

To describe the process and outcomes of a routine assessment of prescribing and remedial training for newly appointed medical trainees.

Methods

City Hospitals Sunderland, United Kingdom (UK), is partnered to Newcastle University Regional Medical School (UK). Trainees attending Trust induction during August 2008 completed a compulsory assessment process. Trainees unable to attend were given an appointment for an alternative circuit two weeks later. The assessment comprised a four station Objective Structured Clinical Examination (OSCE) reflecting routine clinical tasks undertaken by trainee medical staff that could potentially expose both patients and the host organisation to risk. The four stations were prescribing, intermediate life support (including defibrillation), male catheterisation and venepuncture (plus blood culture) technique. Training mannequins were used for all procedures where appropriate. Candidates were given written instructions at each station with a maximum of seven inclusive minutes to undertake the tasks.

Performance at each station was assessed against pre-defined domains assessing infection control techniques, ability to adequately select, prepare and safely dispose of equipment, and the ability to sequence and complete the procedure. For each domain within the station, candidates were scored as having completed the tasks or not.

Pre-specified 'critical' domains were identified within each station i.e. those tasks which if not completed correctly or omitted would expose the patient, staff or the host organisation to clinical risk, either directly or indirectly. Any candidate who scored a 'critical' error was considered to have failed the station.

The prescribing station comprised a written case (Appendix 1) in which the candidate was asked to read a clinical scenario and prescribe the specified drugs on a standard hospital prescription chart. A British National Formulary (BNF) was available. The station was designed to reflect prescribing situations and medications commonly used in routine practice. It was developed in consultation with outgoing Foundation Year 1 and 2 doctors, who participated in a mock circuit to ensure that completion was feasible within seven minutes.

Domains assessed for the prescribing station included: appropriate documentation of patient identification and allergies, the prescription of four drugs (a short course of antibiotics, two routine, and one 'as required') and the correct prescription of a routine insulin and warfarin dosage. Insulin and warfarin prescribing charts used in current clinical practice within the Trust were provided. The warfarin chart also included a Fennerty dose calculator, from which trainees could read the appropriate treatment dose [10].

The station was marked by a consensus panel of assessors who determined that any prescription with an error in any of the following domains was deemed non-dispensable: generic name, dosage, units, frequency, route of administration, signature (including block capitals), dating and illegible writing.

Any error that, if dispensed or omitted, could result in a severe drug-related adverse event (fatal, life threatening, medically significant or prolonging hospitalisation) was considered critical [11].

On completion of the circuit candidates were immediately debriefed and advised of their overall performance and any necessary course of immediate remedial action where appropriate. Results were forwarded electronically to each trainee's educational supervisor to help inform the initial supervisory meeting. Candidates who made critical errors were deemed not to be competent in this area. They were advised not to perform the relevant procedure without supervision; their clinical director and educational supervisor were informed and the trainee was invited to remedial training and reassessment.

Remedial training for the three practical elements of the OSCE consisted of a demonstration of the correct way to perform the procedure in small group sessions with an opportunity for trainees to ask specific questions and practice their technique. For the prescribing station, guidelines on best prescribing practice were sent electronically to all trainees along with a copy of the scenario. Reassessment using the same case scenario took place over a period of two weeks. Early feedback from trainees suggested that additional time was required for the prescribing station and therefore, for the second and any subsequent attempts, a maximum of fourteen minutes was available for completion.

We report here the results of the prescribing assessment and the impact of remedial training on candidate performance. Descriptive statistics, including median and interquartile range (IQR), were used for proportional data together with box-plots, whilst the Mann-Whitney test was used to compare scores between groups.

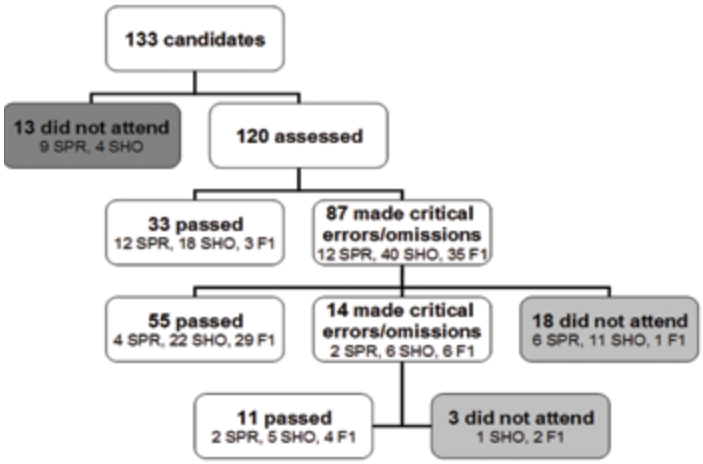
Results

Out of a population of 133 trainees, 13 did not attend; a total of 118 trainees completed the four-station OSCE-circuit, and a further two completed only the prescribing station. Trainees included Foundation Year 1 doctors, Senior House Officers (SHO), FTSTA (fixed term specialty training appointment) doctors, specialist and core trainees, and specialist registrars. Foundation Year 2 trainees were excluded from the process having previously undergone a similar process at previous Trust induction.

Out of the 118 trainees, 78.8% (93/118) failed to pass all four stations; 94% (87/93) of whom failed the prescribing station. In comparison, 44.1% (41/93) failed defibrillation, 20.4% (19/93) failed male catheterisation and 21.5% (20/93) failed blood culture technique.

In total, 120 trainees completed the prescribing station, of whom 72.5% (87/120) made critical errors or omissions and therefore failed the station. Of the 87 trainees who were deemed to have failed prescribing, 79.3% (69/87) were reassessed (Figure 1). At reassessment 79.7% (55/69) passed on their second attempt, 78.6% (11/14) passed on their third attempt; and three failed to attend further reassessment.

Figure 1: Flow chart of trainee performance on the prescribing station



Trainee performance and training grade

A raw percentage score was derived for each candidate's performance and compared across three groups of training grades: 'FY1' grade (Foundation Year 1 doctors), 'SHO' grade (SHO / core trainees / FTSTA doctors), and 'SPR' (specialist trainee or specialist registrar).

The overall median scores and their distribution are shown in Figure 2 and Table 1. Both 'SPR' and 'SHO' doctors performed better than 'FY1' doctors (Mann-Whitney test, $p<0.001$, $p=0.12$ respectively).

Figure 2: Trainee performance on the prescribing station by training grade; overall median raw percentage scores and distribution

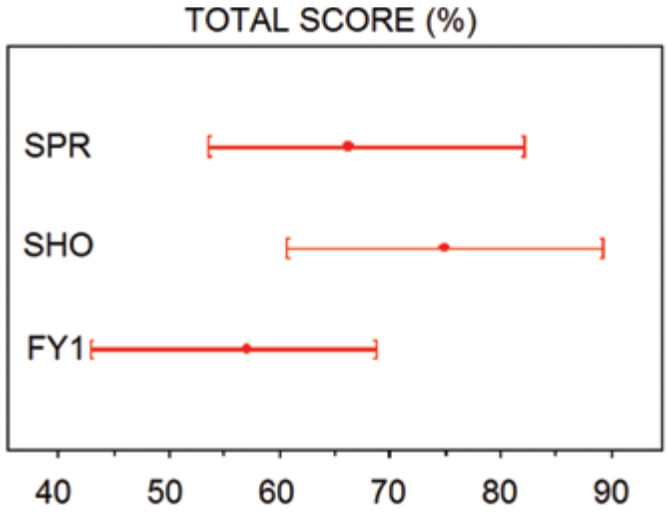


Table 1: Trainee performance on the prescribing station; overall median raw percentage scores and distributions for all trainees and training grade groups

Grade	Median	Interquartile Range (IQR)	Standard Deviation
All	67.9	50.0 to 82.1	22.6
'FY1'	57.1	42.9 to 68.75	21.6
'SHO'	75.0	60.7 to 89.3	20.8
'SPR'	66.2	53.6 to 82.1	23.3

A wide range of critical errors was made across all training grades; range 0-9 (Table 2). When the number of critical errors made were compared via a Mann-Whitney test, similar differences emerged with 'SHO' doctors performing significantly better than FY1 doctors ($p=0.003$). SPRs made fewer critical errors than FY1 doctors, but this was not statistically significant ($p=0.32$).

Table 2: Trainee performance on the prescribing station; overall median number of critical errors and range

Grade	Median	Range	Interquartile Range (IQR)	Standard Deviation
'FY1'	4.5	0 to 8	2 to 5	3.05
'SHO'	2.5	0 to 9	0 to 4	3.7
'SPR'	3.0	0 to 9	2 to 5	3.4

The most common critical errors were: the prescription of the wrong dose of warfarin (59.2%), failure to stop aspirin (44.6%) and inappropriate abbreviation of 'units' when prescribing insulin (39.8%). 47 candidates (38.8%) prescribed amoxicillin in a penicillin allergic patient (Table 3).

Table 3: Frequency of critical errors (%) made by all trainees

Critical Errors	%
Wrong warfarin dose	59.2
Aspirin not stopped	44.6
'U' instead of 'Units'	39.8
Amoxicillin prescribed	38.8
Illegible insulin prescription	38.1
Illegible warfarin prescription	37.0
Illegible kardex prescription	23.1
Allergies not documented	19.8
Inadequate patient ID	8.3

Trainee feedback

Trainees were asked to provide feedback on the assessment process using a questionnaire. 82.5% (99/120) responded, of whom 84.8% (84/99) considered the prescribing station was a relevant skill on which to be assessed. However, 84.8% (84/99) also considered that the time given to complete the station was too short. Overall, 60.6% (60/99) of the candidates who responded, felt that the competency assessments were a useful exercise. Only 48.4% (48/99) felt that the competency assessments were an acceptable method of evaluating their current clinical performance.

Trainees who failed their first attempt at the prescribing station assessment and did not re-attend further assessments, were asked their reasons of absence. Out of 21 trainees 16 (76%) responded; 12.5% (2/16) felt that it was not relevant to their training, 25% (4/16) could not get time away from the ward, 37.5% (6/16) forgot, 18.8% (3/16) were unable to book into a further session, and 6.3% (1/16) was unaware that they had to re-attend.

Discussion

As part of an evolving process of Trust induction, this study established a measure of trainees' competence in prescribing skills. We managed to assess 90% (120/133) of all trainees at the Trust, and those who did not attend were specialist registrars who had already been working within the Trust for several months.

We had not anticipated such a high rate of critical errors in the first round of assessments. Remedial training days were set up, but were largely unattended as doctors forgot to come, or could not get away from their clinical duties. The resources needed in terms of equipment, staff time and room facilities were therefore not efficiently used. Eventually it was deemed impossible to retrain every doctor, as they simply were not engaging in the process.

In undertaking this assessment we sought not to undermine the roles of the clinical and educational supervisors who are responsible for overseeing the trainees' safe practice and clinical skills acquisition in the work place. Cognisant of the need to inform supervisors where problems were identified, we provided real time electronic transfer of concerns, following critical errors or omissions, via the trust electronic mailing system. Even with such measures, day-to-day supervision of prescribing is a challenge, especially when supervisors may not routinely be on site, or the trainee is working out of hours or at weekends. Nevertheless, we did demonstrate a reduced rate of error in those who attended remedial training.

Overall, many trainees felt that the competency assessments were a useful and relevant exercise, although they also thought the exercise did not adequately reflect their clinical performance. We recognised that the initial seven minutes given for the prescribing exercise was considered too short by the majority of doctors, therefore, twice as much time was provided in the reassessment phase. The pass rate on the second attempt increased from the original 28% (33/120) to 80% (55/69), which may have been because the trainees had longer to complete the assessment, or because of re-training; but is likely to be a combination of both. Furthermore, there is also the possibility of a learning effect due to familiarity with the clinical scenario provided for the exercise.

The type and range of errors made suggest that difficulties arose not only as a result of time pressures. The omission of unique patient identifiers and documentation of allergies suggests a lack of structured process when undertaking prescribing tasks. The failure to stop aspirin as directed in a patient already taking warfarin raises issues beyond process. Knowledge of drug interactions may be acquired at undergraduate level, but their recognition requires a subliminal awareness of both 'the common' and 'the dangerous' that triggers review with such co-prescribing. Many trainees simply ran out of time before completing the warfarin chart. Nevertheless there was a lack of familiarity with the local prescribing forms and failure to follow the Fennerty guidance provided therein.

When interpreting these errors it is important to recognise that trainees brought with them practices and experience from previous employment, where non-standard use of abbreviations (for example, *'u'* instead of *'units'* for insulin prescribing, or *'mcg'* instead of *'micrograms'*) may have been inadvertently permitted despite policy and published guidance [12].

Undertaking the prescribing assessment as part of a four-station OSCE-circuit is, of course, an unrealistic representation of clinical practice. However, by embedding the station within a series of time limited clinical skills stations, we sought to create pressure of time and concentration as would be experienced in clinical practice.

As expected, 'training grade' doctors scored better than FY1 and 'non-training grade' doctors. This is likely to be due to a combination of training and clinical experience. Non-training grade doctors are employed by NHS trusts for service provision, they are not regulated by the UK Royal Colleges or Deaneries and do not usually receive formal educational supervision or assessment of competence as part of a regulated training programme. However, it must be remembered that all doctors employed by UK NHS Trusts (or any medical organisation world wide) are expected to be competent in these core clinical skills.

Although doctors receive training, advice and supervision in prescribing from a number of sources, it is not known whether other professions would make a similar proportion of errors if working in similar circumstances and with similar supervision.

Previous studies have confirmed that prescribing errors made by junior doctors cannot simply be attributed to lack of knowledge [13, 14]. Such mistakes tend to be multi-factorial in aetiology, with contributory factors including individual workload, poor communication within hierarchical clinical teams, lack of familiarity with the patient, poor self-awareness of errors and the 'misconception' that prescribing is a routine, repetitive task of low-risk and low-importance.

The UK NHS Trust in which this assessment was performed has moved to a system of electronic prescribing. Although this has been shown to reduce some types of prescribing errors in both adult and paediatric patients [15, 16], it is still possible to omit details of patient allergies; furthermore, drug interactions may not be highlighted.

Recent meta-analyses have shown that computerised prescribing systems are often ineffective in providing physician alerts regarding drug interactions [17] and furthermore are not associated with a reduction in the incidence of adverse drug reactions [16, 18]. In addition, there is recognition that electronic prescribing can merely generate a new type of error such as selection of incorrect medication, doses or frequencies from an automated menu or inappropriate selection of default options [19, 20, 21].

Conclusion

Prescribing is a critically important core and life long skill for doctors. Patchy introduction of electronic prescribing using differing systems has the potential to reduce experiential learning and skills in prescribing, especially in those trainees rotating between hospitals and community settings, where they may at times be called upon to use traditional written prescriptions.

Although considerable emphasis is now given to the teaching of prescribing skills in undergraduate and UK Foundation Medical School curricula, it is clear that a more integrated strategy is required across the UK National Health Service to standardise the way electronic prescribing is implemented and to reduce local variations in the use of non-standard prescribing processes for common, but potentially dangerous, drugs.

References

1. General Medical Council. (2003). Tomorrow's Doctors. London, General Medical Council (GMC). Available at: http://www.gmc-uk.org/static/documents/content/TomorrowsDoctors_2009.pdf [Accessed March 2009].
2. Illing J et al. (2008). How prepared are medical graduates to begin practice? A comparison of three diverse UK medical schools. A report for the General Medical Council (GMC) Education Committee.
3. Heaton A, Webb D J, Maxwell S R. (2008). Undergraduate preparation for prescribing: the views of 2413 UK medical students and recent graduates. British Journal of Clinical Pharmacology. **66**(1):128-134.
4. Dean B, Schachter M, Vincent C, Barber N. (2002). Prescribing errors in hospital inpatients: their incidence and clinical significance. Quality and Safety in Health Care. **11**(4):340-344.
5. Song L, Chui W C, Lau C P, Cheung B M. (2008). A 3-year study of medication incidents in an acute general hospital. Journal of Clinical Pharmacy and Therapeutics. **33**(2):109-114.
6. Hart A R, Brown C L, Clark S J. (2008). Can junior doctors prescribe? Archives of Disease in Childhood. **93**(7):636-637.
7. Garbutt J M, Highstein G, Jeffe D B, Dunagan W C, Fraser V J. (2005). Safe medication prescribing: training and experience of medical students and housestaff at a large teaching hospital. Academic Medicine. **80**(6):594-599.
8. Clinical Negligence Scheme for Trusts (CNST) NHS Litigation Authority. Available at: http://www.nhsla.com/Claims/Schemes/CNST/ [Accessed April 2009].
9. Gray C S, Hildreth A J, Fisher C, Brown A, Jones A, Turner R, Boobis L. (2008). Towards a Formative Assessment of Classroom Competencies (FACCs) for postgraduate medical trainees. BMC Medical Education. **8**(61).
10. Fennerty A, Campbell I A, Routledge P A. (1988). Anticoagulants in venous thromboembolism: Guidelines for optimum treatment. British Medical Journal. **297**(6659):1285-1288.
11. Safety Information (2008). Medicines and Healthcare products Regulatory Agency. Available at: http://www.mhra.gov.uk/Safetyinformation/index.htm [Accessed April 2009].
12. British National Formulary. (2009). British Medical Association and Royal Pharmaceutical Society of Great Britain. Available at: http://www.bnf.org [Accessed April 2009].
13. Dean B, Schachter M, Vincent C, Barber N. (2002). Causes of prescribing errors in hospital inpatients: a prospective study. Lancet. **359**(9315):1373-1378.
14. Coombes I D, Stowasser D A, Coombes J A, Mitchell C. (2008). Why do interns make prescribing errors? A qualitative study. The Medical Journal of Australia. **188**(2):89-94.
15. Shamliyan T A, Duval S, Du J, Kane R L. (2008). Just what the doctor ordered. Review of the evidence of the impact of computerized physician order entry system on medication errors. Health Services Research. **43**(1 Part 1):32-53.
16. van Rosse F, Maat B, Rademaker C M, van Vught A J, Egberts A C, Bollen C W. (2009). The effect of computerized physician order entry on medication prescription errors and clinical outcome in pediatric and intensive care: a systematic review. Pediatrics. **123**(4):1184-1190.

17. Sweidan M, Reeve J F, Brien J A, Jayasuriya P, Martin J H, Vernon G M. (2009). Quality of drug interaction alerts in prescribing and dispensing software. Medical Journal of Australia. **190**(5):251-254.
18. Durieux P, Trinquart L, Colombet I, Niès J, Walton R, Rajeswaran A, Rège Walther M, Harvey E, Burnand B. (2008). Computerized advice on drug dosage to improve prescribing practice. Cochrane Database Systematic Review. (3):CD002894.
19. Donyai P, O'Grady K, Jacklin A, Barber N, Franklin B D. (2008). The effects of electronic prescribing on the quality of prescribing. British Journal of Clinical Pharmacology. **65**(2):230-237.
20. Koppel R, Metlay J P, Cohen A, Abaluck B, Localio A R, Kimmel S E, Strom B L. (2005). Role of computerized physician order entry systems in facilitating medication errors. Journal of the American Medical Association. **293**(10):1197-1203.
21. Nebeker J R, Hoffman J M, Weir C R, Bennett C L, Hurdle J F. (2005). High Rates of Adverse Drug Events in a Highly Computerized Hospital. Archives of Internal Medicine. **165**(10):1111-1116.

Appendix 1: 'Prescribing station'

'PRESCRIBING STATION' - CANDIDATE INSTRUCTIONS

You are on nights covering the wards. It is 7.30am on 4/8/08 and you are asked to ward E52 to see Mr Smith, who has been admitted under Dr Jones.

You are given his GP letter to update you on his case. During the admission he has been diagnosed with a pulmonary embolism. He has been started on warfarin, his aspirin has been stopped.

The nurses inform you they have received a urine microbiology report confirming he has a urinary tract infection (UTI). Unfortunately his drug chart ('Kardex') has gone missing, you are required to:

- Re-prescribe his pre-admission medications
- Prescribe him 5 days oral antibiotics
- Complete his insulin and warfarin charts for today

Blood sugars (BMs) are stable on his current regime; this morning his BM was 6.5.

INR was sent earlier today and the result is 2.4.

You do not need to prescribe enoxaparin (Clexane®).

MICROBIOLOGY REPORT

Mid stream urine sample from 02/08/2008
Pus cells +++
Red blood cells +
Organism: **Coliform bacillus**
Colony count: **$>10^5$ organisms/ml**

Amoxicillin:	***Sensitive***
Cefalexin:	*Resistant*
Trimethoprim:	***Sensitive***
Nitrofurantoin:	*Resistant*

GP LETTER

01/08/08

Dear Doctor,

Re: Mr John Smith, DOB 07/11/1928, X6752452.

I would be grateful if you could admit this 79 year old man who has presented with a 24 hour history of sharp chest pain. He has a past medical history of hypertension, type 2 diabetes, osteoarthritis and ischaemic heart disease.

His current medications are:-

- Perindopril 2 mg
- Digoxin 62.5 mcg
- Aspirin 75 mg
- Paracetamol as required, for his joint pain

His insulin regime is normally:

- 8 units of Actrapid® with breakfast
- 10 units of Actrapid® with lunch
- 12 units of Actrapid® with his evening meal
- 20 units of glargine at night.

He gets a widespread allergic rash when taking penicillin.

Thank you for your help.

Yours sincerely

Dr L. Brown

If you would like to subscribe to IJOCS, please contact subscription@ijocs.org

INTERNATIONAL JOURNAL OF CLINICAL SKILLS

IJOCS

DOCENDO AC DISCENDO

If you wish to submit material for publication, please email info@ijocs.org

Clinical Skills Lab (CSL)

The Clinical Skills Lab database will comprise information on over 200 clinical skills, broadly separated into:

- ➔ History taking skills
- ➔ Communication skills
- ➔ Clinical examination/interpretation skills
- ➔ Practical skills

Not only will this valuable resource provide material to students as a learning tool and revision aid, for example, OSCEs, it will also offer educational materials for teachers from all disciplines, allowing some standardisation of practice. The Clinical Skills community will also be encouraged to contribute, making this database interactive.

CSL is a free not for profit database. Visit **www.ijocs.org** for access